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Educational Outcomes of Postsecondary Occupational Students

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This Brief discusses a research study that was conducted to determine the rates of degree completion of community college occupational students compared with other types of postsecondary students, and to identify factors that might explain those differences. Much of the existing literature on college persistence and completion is focused on baccalaureate students and pays little attention to students in community colleges, and even fewer studies consider differences by students' program of study. Therefore, it is important to investigate whether students in occupational programs in community colleges persist in postsecondary education and attain degrees at similar rates as their academic and baccalaureate peers.

Community college students, as defined here, are those taking for-credit courses at a two-year or less than two-year institution, or at a four-year institution, and who are pursuing a certificate or associate degree, or seeking no degree. Thus, *community college student* is a descriptive term independent of the type of institution the student is attending; rather, the designation is based on the student's type of degree program. While we include some students at four-year institutions because of their stated degree objective, nearly 90 percent of all community college students fitting this definition attend two-year or less than two-year institutions, with more than three-quarters attending public two-year institutions.

Occupational students constitute a group within the community college student population whose self-reported major is in one of the following vocational fields of study: agricultural business and production, agricultural sciences, business, communication technologies, computer and information science, construction, engineering, engineering technologies, health professions, home economics, mechanics and repair, personal services, precision production, protective services, science technologies, or transportation. *Academic students* also comprise a group of community college

students. Their self-reported major is in an academic field of study (humanities, mathematics, science, or social science). *Baccalaureate students* are those taking for-credit courses toward a bachelor's degree at a four-year institution.

Past Research Findings on the Educational Outcomes of Postsecondary Education

There is extensive literature on college persistence and completion, but most of it considers only students at four-year institutions. This research indicates that both the timing and the sequencing of the postsecondary experience have significant effects on the number of years of college completed. Delaying enrollment, working off-campus while enrolled, and interrupting enrollment all have negative effects on the probability of bachelor's degree completion. Other important determinants of degree attainment are the student's academic achievement and pre-college academic records; a residence on or near campus; participation in extracurricular activities; and the availability of financial, educational, and family resources, such as the receipt of financial aid or a family with a higher socioeconomic status (Astin, Tsui, & Avalos, 1996; Pascarella & Terenzini, 1991; Tinto, 1993).

Only recently have researchers started to focus on the educational outcomes of students at community colleges. Most of their efforts have been built upon studies focused on four-year institutions, however (Cofer & Somers, 2001; Wild & Ebbers, 2002), and their theoretical frameworks are based on factors that characterize four-year institutions. For example, Pascarella and Terenzini (1991) indicated that attrition at a community college was a function of the relatively low levels of prestige that community colleges have and the absence of residence facilities. In other studies, Bers and Smith (1991) and Napoli and Wortman (1998) analyzed the persistence of community college students from an institutional perspective, using social and academic integration as main predictors. They found that students who worked full-time and those who had family responsibilities were less likely to persist. Furthermore, students' academic and social integration was found to affect persistence positively. Bers and Smith's study also found that students who took courses with the purpose of receiving a degree or of transferring were more likely to persist than

those who took courses for job-related or personal enrichment reasons. Again, these studies were based on concepts of academic and social integration, which are not necessarily suitable for analyzing the unique characteristics of community colleges.

The research on the effect of different fields of study has also been rather scarce. Evidence from studies focused on four-year institutions seems to suggest that the net influence of the field of study on educational attainment is mixed (Astin et al., 1996; Pascarella & Terenzini, 1991), while the impact of the field of study on the educational attainment of community college students remains to be studied.

In spite of the rich research on educational attainment of four-year students, the state of research about what factors affect completion for two-year students, and particularly students in certificate programs and occupational fields of study, remains scarce. Our study has filled part of this void by focusing mostly on students in certificate and associate programs in community colleges, and by providing substantial evidence on the educational outcomes of occupational students within these groups.

Classification of Postsecondary Students

Our approach to studying persistence and degree attainment consisted of an analysis of students' completion of educational goals. Therefore, we divided the samples considered into three groups of postsecondary students, based on their stated credential objective: certificate, associate degree, or bachelor's degree. We then sub-divided these groups into occupational and academic students. Next, we developed a model of the factors that predict outcome attainment. The model includes student characteristics such as gender, race, age, socioeconomic status (SES), and academic skills. It also includes information about the timing and sequencing of a student's educational experience (pathway features): delayed enrollment, part-time attendance, interruptions, and working while enrolled. Finally, in conjunction with the analysis of the outcomes of occupational education, we generated results about the effects of demographic, academic, and pathway characteristics on the students' educational goal achievement.

Postsecondary Students by Degree Goal

Our focus on goals led us to classify postsecondary students into the following groups. *Students with the goal of earning a certificate* are first-enrollment community college students who indicate that they are pursuing certificate degrees or, according to their institution, are in certificate degree programs. This group has a larger percentage of female students and, on average, its members are older at their first postsecondary enrollment than are students in the other categories. A large percentage of certificate students are married when they first

enroll, and, in comparison with members of the other groups, are the most likely to have a child by their first postsecondary enrollment. They come from a relatively disadvantaged background by SES measures, and are the most likely to have a General Education Development (GED) diploma and the least likely to have enrolled in an academic concentration while in high school. A substantial proportion of certificate students attend college full-time, and this group has a low level of enrollment interruptions and the highest percentage of students with low levels of working while enrolled.

Students with the goal of earning an associate degree are first-enrollment community college students who state that they are attempting to earn an associate degree, and all students in two-year institutions who state that they are expecting to earn a bachelor's degree (since the highest degree possible at most two-year schools is an associate degree). In the BPS89 sample (see the box on page 6 of this Brief for information on data sources for this study), associate students have a lower percentage of minority students than the certificate group but higher than the baccalaureate group, while in the NELS sample the percentage of black and Hispanic associate students is slightly higher than both of the other groups. The associate group has, on average, a higher percentage of older students than the baccalaureate group, but a lower percentage than the certificate group. This group is also in the middle in terms of family composition, SES and educational background, and percentage of occupational students. Finally, associate students are the most likely to interrupt enrollment, to attend part-time, and to work while enrolled.

Students with the goal of earning a bachelor's degree are first-time baccalaureate students. The percentage of racial/ethnic minorities is the lowest in this group, although Asians tend to be overrepresented relative to other groups. Baccalaureate students are also the youngest, and only a negligible percentage are married or have a child when first enrolled. Furthermore, they come from relatively advantaged households, having highly educated parents and the highest average household income. Interestingly, even though baccalaureates come from high SES backgrounds, they constitute the group most likely to receive financial aid. This group has superior middle school and high school records in terms of high school curriculum, test scores, and type of diploma attained. In terms of pathways, baccalaureate students are most likely to attend full-time and most likely to have uninterrupted enrollment, while a relatively high percentage of them work while enrolled.

Students in Occupational Fields of Study

Within each of the three student degree groups, we used the student's first declared major and the classification scheme developed by Choy and Horn (1992) and widely employed by the National Center for Education Statistics (NCES) to identify

occupational students. Among those who declared a major, the vast majority (approximately 90 percent) of certificate students are in occupational majors. More than 60 percent of associate students who declare a major are occupational. Interestingly, baccalaureate students are about evenly divided between academic and occupational majors, indicating the importance of occupational education even at the baccalaureate level. Community college students who aspire to a bachelor's degree are more likely than four-year college students to be in occupational fields, but less likely than their community college peers seeking an associate degree.

Our analysis of occupational students focuses on the associate group. Certificate students are dominated by occupational majors, making a comparative analysis against the small academic certificate population insignificant. Among baccalaureate students, occupational students have, as will be shown below, more or less the same outcomes as other baccalaureate students.

It should be noted that there are important differences between the occupational associate groups in the two datasets we studied. The occupational students in BPS89, as compared with their academic peers, tend to be older, are more likely to be married, and are less likely to be dependents. They are also more likely to have a GED, but less likely to have taken at least one remediation course (possibly because occupational programs do not have remediation as a prerequisite for the enrollment of under-prepared students, not because the students did not have a need for it). Occupational students are less likely to attend full-time, and on average have accumulated fewer full-time equivalent (FTE) semesters during the five-year window than their academic counterparts. In contrast, the differences in characteristics between the academic and occupational associate students are not that large in the NELS sample. However, the percentages of students with disabilities, married when first enrolled, or with children are considerably higher for the NELS occupational students than for their academic peers.

These differences among samples notwithstanding, overall, occupational students in the associate group tend to have characteristics—particularly delayed enrollment, part-time enrollment, and family responsibilities—that are associated with lower retention and completion rates.

Educational Outcomes of Community College Students

Community college students have varied degree objectives when they first enroll in postsecondary education. Therefore, in order to measure the educational outcomes of students relative to their stated goals and initial program of study, we assigned the following definitions of completion. Certificate students are considered completers if they earn a certificate or an associate or bachelor's degree, or if

they transfer to the baccalaureate level within the period of observation. Associate students have to earn an associate or bachelor's degree or transfer to the baccalaureate level in order to be classified as completers. Baccalaureate students are classified as completers only if they earn a bachelor's degree.

The demographic and background factors considered in this study have varying effects on the educational attainment of the students, depending on which group is being analyzed. However, in general, attendance patterns have the most important influence on the educational outcomes of students in all groups. That is, attending part-time, interrupting enrollment, and delaying enrollment after high school all have negative effects on educational goal achievement.

Completion Rates

Degree Goal. Baccalaureate students are the most likely to achieve their goal, with completion rates of nearly 60 percent for BPS89 and almost 75 percent for NELS (see Table 1; the higher rates in NELS are expected due to the longer period of observation). The demographic and background variables that positively influence baccalaureate students' probability of completion are being female and having at least a middle-high SES background, both of which have large influences. To a lesser degree, having dependent status and at least one parent with a bachelor's degree increase the probability of degree attainment. Pathway characteristics also have a significant influence on the probability of earning a bachelor's degree; full-time attendance increases the probability substantially, while delaying or interrupting enrollment and working while enrolled decrease the probability.

Certificate students are the next most likely to achieve their goal or a higher goal. Slightly more than half of all certificate students in BPS89 and two-thirds of those in NELS attained a certificate or higher degree, or transferred to the baccalaureate level. Demographic, SES, and educational background variables have no significant effect on completion for certificate students. The effects of the pathway characteristics differ by the dataset considered. In the BPS89 sample, interrupting enrollment has a significant negative effect on the probability of completion, and working more than three-quarters of the time while enrolled has a negative effect as well. Interestingly, attending part-time does not lower a student's probability of meeting an educational goal. In NELS, delaying enrollment in postsecondary education for a year after the expected high school graduation reduces the probability of certificate attainment by 25 percent.

The group with the lowest completion rate is associate students. Among BPS89 associates, only 44 percent completed within the five years, although a more promising but still low 54 percent of NELS associates completed their degree goal or a higher

Table 1: Completion of Degree Goals

Certificates	All		Occupational		Academic	
	BPS	NELS	BPS	NELS	BPS	NELS
Non-Completers: No Certificate, No Degree, or Still Enrolled	46.8	32.0	46.0	31.7	-- ¹	33.8
Completers: Certificate, Associate, Transfer, or Bachelor's	53.3	68.0	54.1	68.3	-- ²	66.2
Associates	All		Occupational		Academic	
	BPS	NELS	BPS	NELS	BPS	NELS
Non-Completers: No Degree or Still Enrolled	55.6	46.0	61.8	47.4	43.2	43.9
Completers: Associate, Transfer, or Bachelor's	44.4	54.0	38.2	52.6	56.9	56.1
Baccalaureates	All		Occupational		Academic	
	BPS	NELS	BPS	NELS	BPS	NELS
Non-Completers: No Bachelor's Degree or Still Enrolled	41.8	27.0	40.9	30.6	42.8	24.2
Completers: Bachelor's	58.2	73.0	59.1	69.5	57.2	75.8

Source: Authors' estimates based on BPS89 and NELS; column percents.

1. Low n for those still enrolled; cannot report totals. 2. Low n for those attaining bachelor's degrees; cannot report totals.

educational milestone. Most of the demographic and background variables considered do not have much independent effect on associate students' chances of achieving their educational goals when controlling for pathway variables. All the pathway characteristics, however, have an important impact on the attainment of associate students, with full-time enrollment and uninterrupted enrollment having significant positive effects.

Occupational Status. Enrollment in an occupational major appears to have little influence on the educational outcomes of certificate students, although this finding is not surprising since the large majority of certificate students are in occupational majors. Occupational status also has no influence at the baccalaureate level, probably because occupationally specific and broader academically oriented education has less meaning at the four-year level where even occupational programs have a strong academic content.

On the other hand, occupational students in associate programs complete their degree objective at lower rates than do their academic associate peers. In BPS89, we found that after five years 62 percent had not completed any degree, and about two-thirds of the non-completers were no longer enrolled. Another 9 percent had completed a certificate, a degree less ambitious than their original objectives. Of students enrolling in the late 1980s and early 1990s, occupational students in the associate group had a lower probability of achieving their educational goals than did academic students.

Special Population Status. As an additional refinement in the study, we analyzed the educational outcomes of certain special populations who are traditionally disadvantaged in postsecondary education: students who are economically

disadvantaged, academically disadvantaged, limited in English proficiency, single parents, of non-traditional age, and females in non-traditional occupational majors. We restricted this analysis to students in the associate group. We found that special population students tend to complete degrees far less often than non-special population students. However, special population students in occupational majors generally do not have significantly different completion rates from their peers in academic majors.

Reasons for the Completion Gap between Occupational and Academic Associate Students

The occupational-academic completion gap at the associate level is partly due to the background characteristics and enrollment patterns of occupational students, all of which are identified with lower levels of completion in college. However, even after controlling for all these differences, the gap remains, albeit smaller. Occupational associate students still have a probability of educational attainment that is between 7 percent (NELS) and 11 percent (BPS89) lower than that of their academic peers.

One reason for the low completion rates of occupational students could be that many of them are seeking specific skills rather than degrees—that is, they can achieve their personal educational goals without completing a degree. In fact, one-third of all occupational students in two-year and less than two-year institutions cite job skills, not earning a degree or transferring, as their primary reason for enrolling. In an analysis of the determinants of three-year persistence using BPS96, we found that students who cited jobs skills as their primary enrollment objective were about 18 percent less likely to complete three years (or to earn a degree before

completing three years) of interrupted or uninterrupted postsecondary education. However, controlling for the reasons for enrolling did not influence the measured effect of occupational enrollment status.

Another explanation for the differences in persistence and completion between occupational and academic associate students is that colleges, even community colleges, are still primarily organized on the academic model. This model, which persists despite the increasing importance of occupational education, emphasizes academic values and processes, which might cause schools to work less effectively with occupational students (Grubb, 1996). Therefore, institutional support in terms of effective pedagogy, advising, or other student services may not be adequate to promote the retention of occupational students.

Finally, a significant finding regarding the effect of occupational education is that the gap between the completion rates of occupational and academic associate students appears to have narrowed between the end of the 1980s and the mid-1990s. We made this judgment based on persistence rates rather than on completion rates. Analyses we carried out on the determinants of three-year persistence rates in the mid-1990s that controlled for personal, family, and pathway characteristics showed a significant negative effect of occupational status for the BPS89 sample but no statistically significant difference between occupational and academic students in the BPS96 sample. However, the convergence of the two groups did not result from an improvement in persistence and completion among occupational students, but rather from a deterioration in those rates for academic students.

Policy Implications

Our research produced two main findings with direct policy implications: enrollment pathways affect educational outcomes for all students, and occupational associate students have a lower completion rate than their academic peers.

Part-time, interrupted, and delayed enrollment in postsecondary education all negatively influence the probability of completion for all types of students, regardless of institution and program type. Therefore, both government and institutional policies must address this deficiency. Either more traditional enrollment patterns among postsecondary students must be encouraged, enabled, and supported, or institutions must develop practices that ensure improved outcomes among the increasing numbers of students who follow non-traditional enrollment paths. The former may be done with effective advisement and financial support that makes students aware of the benefits of educational persistence and completion and provides them the financial resources necessary to realize that achievement. Promoting completion among students following non-traditional education pathways is a

more challenging task because of their variety of reasons for taking such a path. Regular contact with students by the school, encouraging even minimal student involvement with the educational institution (enrollment in a single course, part-time work on campus), and developing activities and programs to promote integration of non-traditional students into the campus and its activities might encourage slow but steady persistence among this group of students.

The lower completion rates of occupational associate students, presented in the preceding section, suggest that a variety of policy and practice changes are needed to improve the outcomes of occupational educational students at the postsecondary level. The evidence seems to indicate that better high school preparation alone would not necessarily close the educational attainment gap between occupational and academic students. Improving high school programs overall, however, would be a key to increasing the educational attainment of students in general.

Policies that do a better job of informing potential occupational students about the academic demands of college are crucial. It seems likely that many students enter postsecondary occupational programs because they believe that these programs have fewer or less stringent academic requirements than academic programs. Indeed, many occupational programs do have weaker academic prerequisites and are less likely to require remediation for students with deficient academic skills. Nevertheless, testing to assess the remedial needs of all occupational students might encourage them to enroll in remediation to develop their academic skills and increase their likelihood of completion. Academic students in the NELS sample have both higher test scores and a higher incidence of remediation as compared with occupational students, indicating that those with higher academic skills are, on average, more likely to receive remediation. Thus, given the lower completion rates for occupational students, a policy that does not require remedial help for these students seems misguided, and colleges need to strengthen their remediation requirements for occupational students and improve the delivery of that remediation.

Since we found no student demographic or background explanations for the occupational completion gap, our research suggests that colleges may work less effectively with occupational students, but any definitive policy recommendation concerning this shortcoming must await a better understanding of the problem. If it does turn out that the colleges do not serve their occupational students well, several possible policy approaches might be implemented. For example, the integration of academic and occupational instruction, both for college-level and developmental courses may be more successful for occupational students. A variety of approaches to advisement and counseling, including an increased focus on job placement, may also be more effective

in addressing the special needs of occupational students.

In conclusion, associate occupational students achieve their stated goals less often than their academic counterparts. Moreover, their record is particularly problematic when compared with baccalaureate students. Part of this difference can be explained by differences in student characteristics and expectations, but the gap still remains after controlling for many of those factors. Our research, therefore, suggests that postsecondary institutions have yet to determine and implement the optimal approach to providing direct occupational preparation within an institutional structure that continues to rest on a foundation oriented towards academic education.

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DATA SOURCES

Two national datasets prepared by the National Center for Education Statistics (NCES) provide most of the information used in our analysis. The first is the Beginning Postsecondary Student Longitudinal Study 1989-94 (BPS89). It surveys a sample of students who entered postsecondary education for the first time in 1989 and follows them through the 1993-94 academic year, tracking the students' progress in postsecondary education during a five-year window. The second dataset is the National Education Longitudinal Study of 1988 (NELS), which follows a sample of eighth grade students in 1988 through the year 2000. This dataset enables tracking of postsecondary education over a six- to eight-year window. A third NCES dataset, BPS96, was also used to analyze student persistence. It follows a sample of students who entered postsecondary education in 1995 through the 1997-98 academic year. Since this dataset provides only a three-year window, it is not well suited for an analysis of college completion, but it provides more recent data than the other BPS dataset.

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This Brief was prepared by the Community College Research Center (CCRC), Teachers College, Columbia University. A related article that analyzes the educational outcomes of occupational community college students, using BPS89, will be published in a forthcoming issue of the *Economics of Education Review*. More information on this topic is available from CCRC.